



L-Sys2 Race Console User Guide

Version 1.7.0

Introduction

Congratulations on the purchase of your L-Sys2 Race Console system, an advanced Lap Timer and Dash Logger packed with many powerful features. The product has been specially designed by racers and engineers for competition racing and track day use. The system has been carefully designed using the latest state of the art computer aided design software, with each unit manufactured in a controlled environment. We are confident that it will give you many seasons of reliable data to both help improve your performance on track, and as an aid to car setup.

IMPORTANT INFORMATION

- **Warning - This product is designed and produced for motorsport and track day use. We do not specifically recommend it nor is it intended for highway use. If it is used on the highway then users do so entirely at their own risk, and they must ensure that the installation conforms to current regulations. Furthermore the lap timing function must be specifically disabled. Refer to configuration settings for further instructions**
- This product must be installed by a technically competent person. The following installation information is only given for guidance, as each installation will generally be different from the next. For further support or guidance please contact a member of our support team.
- This product is designed for use with 12v in car power systems only. It is not compatible with 24V or 48V power systems
- Before commencing with the installation and any subsequent use of this product your attention is drawn to the product limitations of use and liability as defined in section headed "Limitations of Use and Liability" on page 26.

Packing List

Depending on which L-Sys2 model you have obtained the following items should be correctly packed and included with the product

L-Sys2 - 'GPS' & 'IR'

All Models:

- 1 x L-Sys2 Race Console Unit
- 1 x Temperature Sensor (0 to 150 deg C)
- 1 x Power / RPM pickup lead
- 1 x Carry / storage case
- 1 x Micro SD memory card (pre-inserted in the race console unit).
- Data Viewing Software (*along with the following files which are pre installed to the SD card*):
 - BJR L-Sys2 Data Viewer software (can be run directly from the SD card, or can be installed if preferred)
 - (this) L-Sys2 User Guide
 - Configuration file set to factory defaults

IR Model:

- 1 x Wheel Speed Sensor
- 2 x Wheel Sensor Magnets
- 1 x Optical Beacon Receiver
- 1 x Optical Beacon Transmitter
- 1 x Set of eight AA batteries

GPS Model:

- 1 x GPS Receiver

Pressure Sender:

- Optional item, please contact us for further purchase information

3 Axis Accelerometer (G) Sensor:

- Optional item, please contact us for further purchase information

In the unlikely event of any items missing or damaged then please contact our support team. Use the contact form located on our on the website at www.bjr-technology.co.uk

Installation

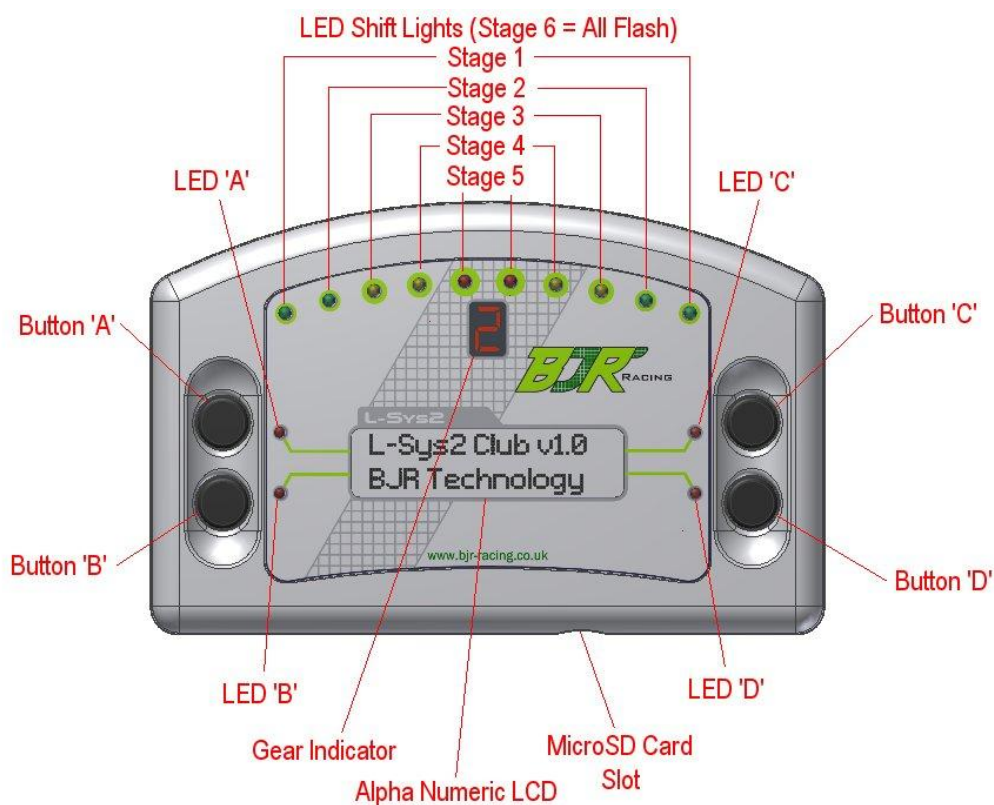
Race Console Installation

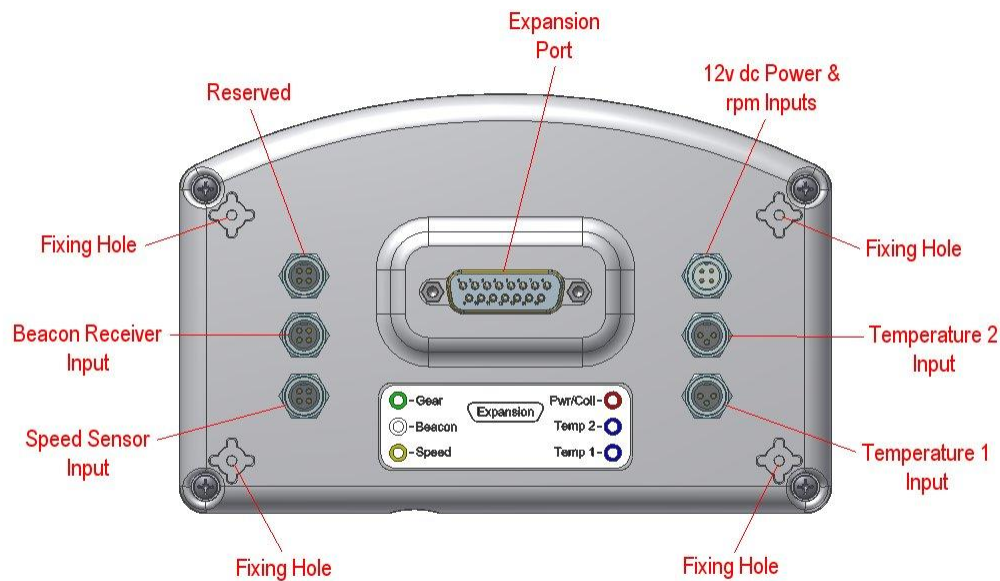
Before commencing installation take time out to plan where the unit will be installed.

Important: The race console unit is rated at IP54 and is water resistant. However it should not be located where any direct water jets, spray or standing water can reach the unit. The unit must be mounted vertically at all times to maintain this rating.

Particular consideration must be given to the routing of sensor cables and the connections to the power lead. If longer sensor leads are required then please contact us to order any extension cables.

Avoid routing the power or sensor cables adjacent to any high current and / or high voltage wiring e.g. battery or starter motor feeds, ignition coil HT leads or near to any high level heat sources such as exhaust systems etc.





Power / RPM Cable

The 'BATT +' (Yellow = 12V DC) wire should ideally be connected to its own dedicated and supply protected by a 500mA fuse or breaker from the power distribution system.

The 'BATT -' (Blue = Ground) wire of the power pair must be connected to the chassis of the vehicle or any other suitable grounding point.

The 'RPM +' (Orange or Grey) wire must be connected to the 'Tacho' or 'RPM' signal output from the ECU or CDI ignition system. It can also be connected to the low tension side of an ignition coil.

Important Note: The 'RPM +' (Orange or Grey) wire, or any other wire must never be connected to any part of the High Tension Ignition lead system. It must not be wound round the HT lead to form a pickup, as the unit is not designed to operate in this manner, and damage may result.

The 'RPM -' (Green/Yellow or White/Black) wire should ideally be connected at the ground point of where the ECU, or coil is attached to the vehicle wiring. If this is not possible then it can be connected to the chassis of the vehicle at any other suitable chassis grounding point. For best results the 'RPM -' (Green/Yellow or White/Black) and the 'BATT -' (Blue) wires must be separated from each other by some distance. It is not good practice to have them connected together at the same grounding point as unexpected results may occur with the RPM reading fluctuating excessively.

Mechanical Mounting

The unit should be mounted in a position where the display and all LED's are clearly visible by the driver. When mounting the unit be sure to use screws of the correct length and size (No 4 x 1/4" plastite screws and washers - as supplied), do not overtighten these fixings. If a panel cutout is required to accommodate the rear panel connections of the unit then refer to Appendix A for an installation / cutting template and full dimensions of the unit.

Power On Self Test

When power is supplied to the L-Sys2 several things happen during the power on self test:

- The LCD module will light up and display a message stating the model along with the version number of the firmware installed along with our web address.
- The Alarm and Shift Lights will light up in sequence and then flash briefly allowing the user to verify their operation
- The number displayed on the gear position indicator will count up from '-', '0', '1' through to '9'.
- Once self test has completed:
 - The LCD module will display a message prompting the next action i.e. Configure, New, Review (providing there is data available for review).
 - The gear position indicator will be displaying '-'.
- At this stage the L-Sys2 has passed all power on tests, and is now ready for use.

GPS Receiver Installation

The GPS receiver is designed to receive signals from the Global Positioning Satellite System and is used with the BJR L-Sys2 Race Console. The unit requires careful installation to get the best possible performance from the GPS system.

The GPS Receiver must be located ideally at the highest point of the vehicle i.e. the top of a roll bar, roof or bonnet mounted. Either way the receiver must have a clear view of the sky and more importantly a clear all round view of the horizon. It should not be effectively screened by bodywork etc. Alternative locations such as on top of the dashboard where the windscreen lower edge meets the vehicle body usually work satisfactorily, but can sometimes result in weak or distorted signal reception, thus potentially giving poorer performance, and inaccurate results.

Avoid routing the GPS receiver cable adjacent to any high current and / or high voltage wiring e.g. battery or starter motor feeds, ignition coil HT leads or near to any high level heat sources such as exhaust systems etc.

The GPS Receiver is plugged into the multiway 'expansion' port on the rear of the race console. Before plugging in make sure the race console is powered off.

Optical Beacon Receiver Installation

The optical beacon receiver is designed to be used in conjunction with the BJR Technology Optical Beacon Transmitter.

The receiver should be mounted in a position where the receiver 'eye' (dark blue and domed shape) has a clear line of sight to the transmitter when passing it. Depending on the track configuration this will need to be swapped from left to right, and vice versa depending on the location of the optical beacon transmitter.

It is possible that other trackside beacon transmitters will also be present, and may trigger the L-Sys2 unit, this is an acceptable scenario, and to avoid this 'false' trigger set the beacon obscuring time to compensate.

Optical Beacon Transmitter

The Optical Beacon Transmitter should be located next to the trackside so that the 'beam' emitted from the transmitter is pointing out across the track in a direct line of sight to the passing receiver which will be located on the car. In clear conditions the range is around 50 metres, however the range will be degraded during wet or misty conditions.

Note: For consistent results it is highly recommended that the Optical Beacon Transmitter is located as close to the track as possible i.e. on the pit wall.

Warning: The transmitter uses proprietary Infra Red emitters similar to those used on domestic equipment remote controls. These are deemed to be eye safe, **however it is strongly advised that the user does not intentionally look, or stare directly into the emitters from a short range at any time.** The six emitters are located on the front of the unit and are dark blue in colour.

The transmitter is powered by eight internal batteries (AA size) which will normally give around 16 hours of continuous use. Alternatively it can be connected to a larger capacity external battery i.e. a 12v 4Ah lead acid battery pack using an optional power adapter lead. When the external power lead is connected the internal battery pack is automatically disconnected. When powering the unit by external power, Do Not use anything other than a 12V battery pack, as this may render the unit unserviceable.

The battery power available is monitored internally by the unit and the status reported by the Red LED located near to the power switch as follows:

Red LED	Status	Action
ON Continuous	Battery OK	None
Flashing slowly	Battery Low	Replace as soon as possible
Flashing rapidly	Battery Critical	Replace immediately
OFF	No power	Switch Unit to On! Replace batteries, or connect a fresh external battery

Battery Replacement

To replace the internal batteries carefully remove the four rear cover screws and put to one side. Remove the battery pack and foam supports. Replace batteries ensure that the correct polarity is observed. Replace the foam supports, battery pack and the rear cover. Do not over tighten the retaining screws.

Temperature Sensor Installation

The temperature sensor body must be fitted carefully to the selected location with the sensor body and / or the threads sealed to prevent any fluid loss. Ensure the cable is routed well away from any high current and high voltage wiring, and well away from any high level heat sources such as exhaust systems etc

Note: The temperature sensor body is designed to be used in low pressure applications such as water and oil sump / reservoir temperatures. It is not intended to be used in any high pressure systems, such as brake lines or high pressure fuel lines etc

Wheel Sensor Installation

The wheel sensor body must be fitted carefully to the selected location. Particular care is required to ensure the sensor is mounted as far away from the brake calliper as possible. The system is designed to operate with a minimum of two magnets attached diametrically opposite to each other to any convenient part of the brake disc rotor assembly.

To improve accuracy and resolution more magnets can be added. Ensure the magnets are equi-spaced, and the L-Sys2 unit is configured for the correct number of magnets installed.

Warning: Under no circumstances must the wheel sensor be wired to any part of an ABS brake system wiring

A certain amount of experimentation may be required in order to achieve optimum pick up from the rotating magnets. See Appendix B for a typical installation of the wheel sensor and magnets.

Alternatively the speed sensor input may be connected to a 5v ECU signal or similar. Contact our support team for details and advise before proceeding.

Pressure Sender Installation (optional item)

It is highly recommended that the pressure sender body is remote mounted and isolated from the vibration of the engine. In the case of a bike engine vehicle it is vital that the sender is isolated from the engine.

Remote mounting can be achieved by connecting the sender to the pressure feed via a braided hose with the correct fittings (vendors such as Think Automotive are able to supply this at a very reasonable cost).

Warning: The pressure sender is rated up to a maximum of 145 PSI (10 bar) ensure the pressure feed to the sender cannot exceed this pressure, and that the remote connection pipe is also able to withstand this pressure.

Avoid routing the pressure sender cable adjacent to any high current and / or high voltage wiring e.g. battery or starter motor feeds, ignition coil HT leads or near to any high level heat sources such as exhaust systems etc.

Connect the slide tags on the cable to the terminals on the sender. The wider tag must be connected to the wider terminal on the sender. Connect the other end of the cable to the race console 'Aux' input (colour coded green)

It is important that the body of the pressure sender has a good ground connection to the engine. Use of certain thread sealers and tapes can effectively isolate the body of the sender unit from ground which may cause pressure readings to be incorrect.

Consider carefully how you configure the Alarms to indicate pressure events. It is often tempting just to configure one alarm for a simple under pressure alarm, however careful consideration of the alarm functions of this product will allow you to configure a two stage alarm. This has the advantage of warning of impending issues rather than absolute pressure failure usually when it is too late and the damage is already done!

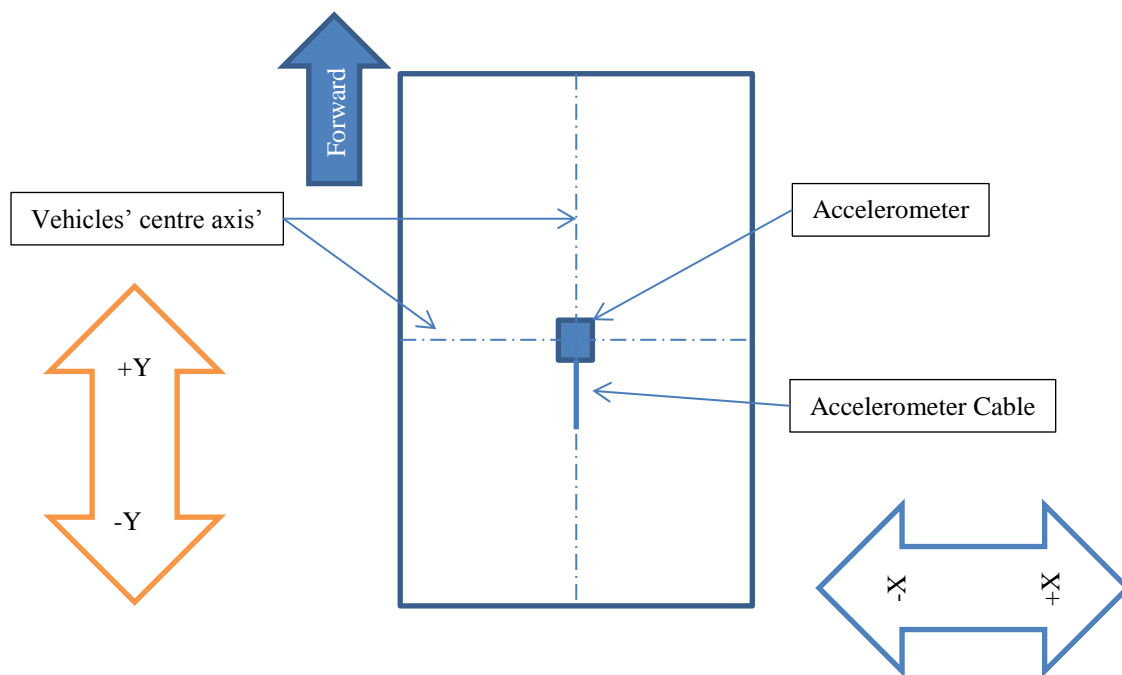
3 Axis Accelerometer 'G' Sensor Installation (optional item)

(v4.2 firmware onwards)

Installation and Location of the device

The accelerometer should be installed in a central position on the vehicle which is:

- As close to the ground as possible
- Is close to, or on both the vehicles' centre axis
- Is a rigid and level part of the vehicle chassis i.e. on a space frame chassis member, or on the top of the transmission tunnel or similar.
- The accelerometer can only be mounted on the floor pan if it is rigidly supported directly underneath by a chassis member, and cannot vibrate
- Ensure the cable which exits the accelerometer case is pointing towards the rear of the vehicle, as this ensures that the accelerometer is then aligned with the correct axis'. If in any doubt refer to the product label on the base of the unit which indicates the forward direction
- Avoid routing the accelerometer cable adjacent to any high current and / or high voltage wiring e.g. battery or starter motor feeds, ignition coil HT leads or near to any high level heat sources such as exhaust systems etc.
- The accelerometer is plugged into the multiway 'expansion' port on the rear of the race console. If a GPS receiver is present, then this should be plugged into the tail connector (15 way D type) which is wired into the accelerometer connector. Before plugging in make sure the race console is powered off.



Testing the Accelerometer Installation

The L-Sys2 has a diagnostic mode specifically for testing the accelerometer installation. To invoke this mode:

1. Power the unit on
2. When prompted press 'New', and cancel any alarm messages
3. Press and hold down button 'B' for at least three seconds, then press button 'D' momentarily. The lower left quadrant of the display should now be displaying the output of the accelerometer i.e. X-0.00 +/- 0.09
4. To check the Y axis output, make sure the unit is displaying the X axis value then repeat step 3. The value should read Y-0.00 +/- 0.09
5. To check the Z axis output, make sure the unit is displaying the Y axis value then repeat step 3. The value should read Z-1.00 +/- 0.09

Note: The X, Y, Z values shown above assume that the device is mounted properly and allows for the fact that the car itself may not be level. Values outside these may indicate that the device is not properly installed.

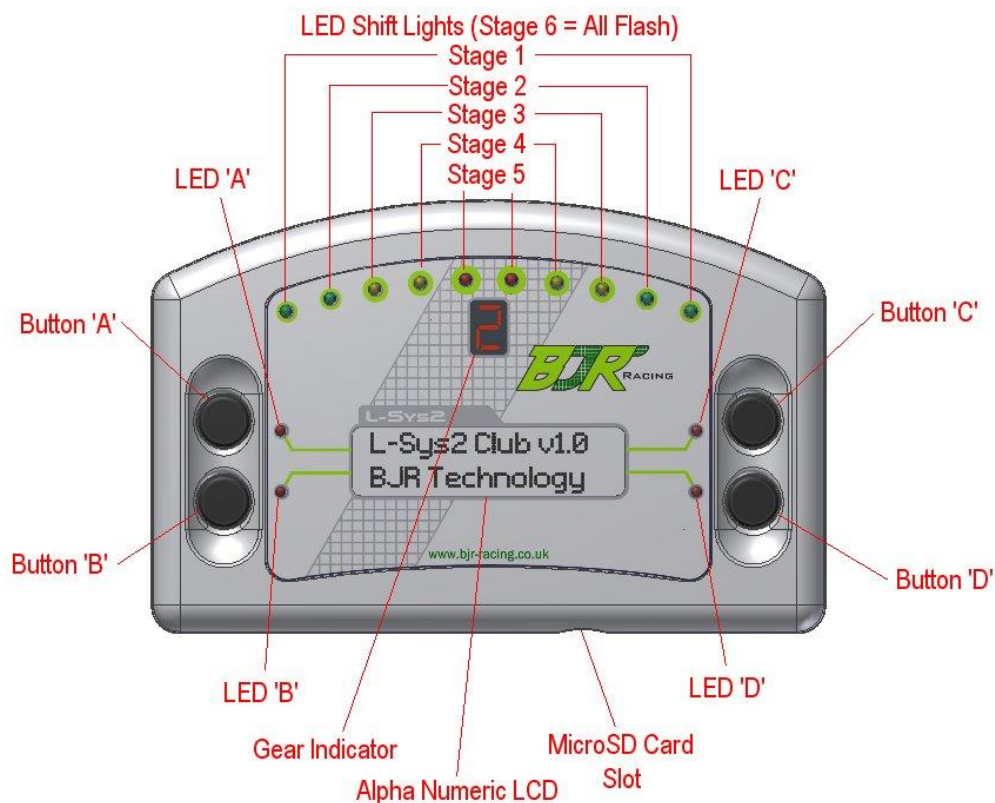
Troubleshooting the Accelerometer Installation

In the event that the accelerometer is giving 'noisy' results when the engine is running then this means the surface to which it is mounted is vibrating in time with the engine. The accelerometer should be moved to a new location and / or isolated with a stiff sound absorbing material. Loose cell expanded foams are not suitable for this application. Ensure the mounting screws are also isolated. The accelerometer itself is internally isolated from the outer case however experimentation may be required to yield the best results depending on the vehicle and engine installation.

Using the L-Sys2 Race Console

Overview

After the power on self test has completed the L-Sys2 has four modes of operation: Configuration Mode, Race Mode, Track Day Mode, and Review Mode. All modes are controlled by four context sensitive push buttons on the front of the unit. Configuration data and acquired data are stored on a proprietary Micro SD flash card located on the bottom face of the unit.



Configuration Mode

After power up press button A to enter configuration mode, here you will find a series of top level menus. Within each menu are a series of sub-menus which allow configuration of the various parameters supported. Using Buttons A, B, C, D allows the user to configure, and store each of the following configurables:-

Configure Menu (Top)

General

- Logging Enable (Y or N)
- Auto Start (Off, 1 – 60 secs)
- Pressure Display Units (PSI or BAR)

Time

Beacon Obscuring Time (2 sec - 15 min)

Beacon Type (GPS, InfraRed, Button, Off)

|
(GPS & Next = Clear Points)

|
Are you Sure (Y or N)

Real Time Clock Setting

Hours

Minutes

Day

Month

Year

Alarms

LED Select (LED A, LED B, LED C, LED D)

Alarm Source (Temperature1, Temperature2, Pressure, Disabled)

Alarm Function (Under, Outside, Over)

Alarm Parameters (Value 1, Value 2)

Engine RPM

Number of Sparks per Engine Revolution (1 - 9)

Shift Lights Mode - Auto

Shift Light 6 Threshold (200 – 20,000 rpm)

Shift Light Step Decrement (10 – 9000 rpm)

Shift Lights Mode - Manual

Shift Light 1 threshold (200 – 20,000 rpm)

Shift Light 2 threshold (200 – 20,000 rpm)

Shift Light 3 threshold (200 – 20,000 rpm)

Shift Light 4 threshold (200 – 20,000 rpm)

Shift Light 5 threshold (200 – 20,000 rpm)

Shift Light 6 threshold (200 – 20,000 rpm)

RPM Pulse Obscuring Time (0 – 9900 uS)

RPM Pulse Minimum Width (0 – 5000 uS)

Speed

Number of Pulses per Wheel revolution (2 – 99) when using wheel speed sensor, or set to 'GS' when GPS receiver is connected.

Wheel Diameter (150 – 999mm)

Speed Units (kph, mph)

Displayed Units Adjustment (0 – 99%)

Gear

Primary Drive Ratio (1:0.001 – 1:5.000)
Front Sprocket Teeth - for bike engine applications (1 – 99)
Rear Sprocket Teeth - for bike engine applications (1 – 99)
Total Number of Gears (1 – 9)
Gear 1 Ratio (1:0.001 – 1:5.000)
Gear 2 Ratio (1:0.001 – 1:5.000)
Gear 3 Ratio (1:0.001 – 1:5.000)
Gear 4 Ratio (1:0.001 – 1:5.000)
Gear 5 Ratio (1:0.001 – 1:5.000)
Gear 6 Ratio (1:0.001 – 1:5.000)
Gear 7 Ratio (1:0.001 – 1:5.000)
Gear 8 Ratio (1:0.001 – 1:5.000)
Gear 9 Ratio (1:0.001 – 1:5.000)
Differential Ratio (1:0.001 – 1:5.000)
Display Update Delay (0 to 5000mS)
Gear Tolerance (0 - 9000)
Note: A setting of around 1500 is suitable for most types of gearbox

Reset All

Are You Sure ?

Select Yes to store changes, or No to abort

About

Provides information about current firmware version and build number installed in each processor, (MAIN, RTM, FAT, GPS when fitted)

Note: Whenever configuration settings are changed you must exit the configuration menu fully and confirm the saved changes when prompted - otherwise any changes made will not be saved.

Live Mode

The unit can be used in one of two modes at any given time i.e. race mode or track day mode.

- To use the unit in Race mode refer to the configuration settings for 'Time' 'Beacon Type' and select either 'GPS' 'Optical' or 'Manual'
 - To use the unit in Track Day mode refer to the configuration settings for 'Time' 'Beacon Type' and select 'None'
- Note: Lap timing is disabled when the unit is in this mode in line with track day requirements

Shortly after power on a menu is available for the user to choose which mode the unit will be placed in.

- To start a new session of data press 'New' (default action). The unit will then enter Live Mode
- If using GPS timing ensure that GPS timing lines have been set (refer to installation section for the procedure on how to do this)

Use the buttons to select the required parameter to be displayed in each quadrant of the display. Depending on which mode the unit is configured for i.e. Timing enabled – or not, the actions available for when timing is enabled are:

Button A

Display of current lap number
Blank the display quadrant

Button B

Display current value for Temperature 1 input (T1:)
Display current value for Temperature 2 input (T2:)
Display current value for the Speed input (SP:)
Display current value for the Pressure input (P:)
Blank the display quadrant

Button C

Last lap Time (LT:)
Best lap Time (BT:)
Display real time clock (hh:mm:ss)
Display the Odometer (OD:)
Blank the display quadrant

Button D

- Display current RPM (RPM:)
- Display time Difference of last lap and Best lap time (DB:)
- Display time Difference of last lap and Previous lap time (DP:)
- Display the trip distance (TR:)
- Blank the display quadrant

Note: When the unit is in 'Track Day Mode' some of the above functions are not available.

When in 'Live Mode' the unit will display complete lap times in real time whilst on track. To analyse the detailed sector times the data recorded should be viewed post session with the L-Sys2 data viewer.

Using the Pressure Sender

Once installed correctly the pressure sender will measure and log the pressure of the fluid to which it is plumbed in to.

Using the 3 Axis Accelerometer (v4.1 firmware onwards)

Once installed correctly the 3 Axis Accelerometer will measure and log the vehicle motion when it is moving.

Using the GPS Receiver

When the system is turned on the status light on the top of the GPS receiver will turn from a solid Red to Flashing Amber indicating the unit is starting to acquire GPS signals. When the light turns to Green the receiver has then acquired all the necessary GPS signal information, and is ready for use.

A correctly installed receiver will usually take up to 60 seconds for the status light to turn Green. However, differing weather conditions and track surroundings can directly affect this start up time. If the unit hasn't been used for a long period of time then the receiver may need to re-acquire satellite almanac and ephemeris data, during this phase the startup time is also affected.

If the startup time is significantly long i.e. more than 15 minutes, then this could be an indication that the receiver isn't correctly installed, and doesn't have a clear view of the entire sky.

Status Light	Current Status	Action
Red Continuous	Power is on, and awaiting GPS satellite signal	None, wait for the light to flash Amber
Amber Flashing	Acquiring satellite positions	None, wait for light to go Green
Green Continuous	Ready	None, begin using the system
Red Flashing, or excessive time for LED to go Green	GPS Error	Restart. If the error doesn't clear then try relocating the receiver to a different location on the vehicle.

Setting the L-Sys2 for GPS Track Timing and GPS derived Speed

1. Power on and enter configuration mode.
 - a. Select 'TIME' from the available menu items
 - b. Press 'ENTER'.
 - c. Select 'GPS'
 - d. Press 'EXIT' and save changes when prompted.
2. Re-enter configuration
 - a. Select 'SPEED' from the available menu items
 - b. Press 'ENTER'.
 - c. Set '#Pulses/Rev' to 'GS'
 - d. Press 'EXIT' once
 - e. Save changes when prompted.

You are now ready to begin marking GPS timing lines detailed in the next section

Setting up the GPS Start / Finish and Sector timing lines

Once the configuration settings are set for GPS timing, and a GPS satellite fix has been acquired, the unit is then able to derive lap and sector times from a series of GPS timing lines that are selected by the driver whilst in motion on the circuit.

For each, and every race meeting it is very important to clear any previous GPS timing line settings, and to mark a new set of timing lines which is best done on the second lap of a practice or qualifying session once starting as you cross the start / finish line.

The following procedure will guide you through the setting of GPS timing lines

1. To clear any existing GPS timing lines:
 - a. Enter Configuration menu
 - b. Select 'TIME'
 - c. Press 'ENTER'
 - d. Scroll to 'GPS'
 - e. Press 'NEXT', you will then be prompted to clear 'Clear Points' i.e. the GPS timing lines
 - f. Press Y to clear, or N to leave them unchanged. A second prompt will allow you to confirm this or to back out. After pressing 'Y' the menu will then automatically take you to the next configurable item in the Time menu i.e. Hours
 - g. Continue configuration if required, or press 'EXIT' to leave the menu, save the settings when prompted.
2. You are ready to configure a new set of GPS timing lines.
3. When prompted press 'New' to start a session.
 - a. Drive around the track at a reasonable pace
Note: If the GPS module has not acquired a satellite fix then the display will warn you of this, continue around the track until a fix has been acquired.
 - b. As you approach or cross the circuit start/finish line press button C adjacent to the prompt 'Set S/F' to mark the GPS start/finish line, the display will then confirm the setting of the line.
 - c. Continue around the track pressing button C each time you wish to establish a GPS Sector timing line. *Note: If simple lap timing based on the start/finish line i.e. no sectors, is required press 'Exit' and confirm settings by pressing button D 'Yes' prompt.*

- d. When you have marked the desired number of GPS timing lines, press button A to 'Exit', and if satisfied press button D 'Yes' to complete this procedure. Selecting 'No' will restart the process allowing you to mark a new set of GPS timing lines *Note: If all sectors available are marked then the unit will automatically exit this menu.*

Getting the best results from GPS Timing:

- For consistent results it is best practice to drive in a straight line, mid track, and at a reasonable pace, whilst marking GPS start/finish and GPS sector timing lines.
- GPS timing lines set on bends may yield undesirable results, and besides from a safety point of view this is not the best place to be setting timing sectors!
- The maximum number of GPS timing lines is four, which creates a four time sectors. Regardless of the number of sectors you require it is best practice to have them spaced equally around the circuit.
- Throughout the process of setting up of GPS timing lines the bottom line of the display is available to show real time information such as Pressure, Temperatures, RPM. Press button B or D to select the information to be displayed.
- GPS timing lines stored will remain valid for a few days

Safety Notes:

- Only set timing lines when you have a clear run around the track, and there are no cars trying to pass you, or the contrary.
- Setting of GPS timing lines is best done on the outlap of a practice, or qualifying session.
- Above all, make sure you are more than familiar with the above process of setting GPS based timing lines so it becomes second nature allowing you to concentrate more on the driving.

Setting the GPS for Track Mapping and GPS based Speed only

1. Power on
 2. Enter configuration mode.
 3. Select 'SPEED' from the available menu items.
 4. Set "#Pulses/Rev" to 'GS'.
 5. Exit and save changes.
- Ensure that the wheel speed sensor is disconnected from the unit.
 - Other than correct GPS receiver installation there is no further specific configuration required for this functionality.

Alarms and Messages

The L-Sys2 features alarm functions, which for any alarm condition will light up an alarm LED along with a message on the display telling the user more about the alarm condition that has occurred.

When an alarm condition occurs, for example: Temperature 1 has exceeded the alarm limit (set during configuration) two things will happen: an alarm LED will light up, and the main display will flash a message telling you what the alarm LED corresponds to. In this case the message 'Temp1' will be flashing.

To clear the alarm message displayed press and hold the corresponding push button for about 1 second next to the flashing message. The alarm message will then clear and resume the display of the previous parameter before the alarm condition occurred. The Alarm LED will continue to be lit until the actual alarm condition clears i.e. the temperature has reduced below the alarm limit set.

The alarm messages that can be displayed are: Temp1, Temp2 for temperature alarms and P'ure for a pressure alarm.

Note: When configuring the alarm parameter 'Is On Outside' ensure that number set for 'value 1' is always less than 'value 2'

Odometer and Trip Meter

The odometer is factory set to zero, and any distance recorded once the unit is in use cannot be reset by the user.

The trip distance meter can be reset at any time by pressing and holding button D for at least three seconds.

Review Mode

Review mode allows the user to review all data on the unit relating to laps completed during the last session. It can be entered in a number of ways:

- Cycle the power to the unit and select 'Review' when prompted.

Note: If the unit is in live mode and the maximum number of laps has been reached, the unit will enter review mode automatically

When Review Mode is entered a summary of the data from the last completed session will be available, use button D to cycle round the session maximums recorded. Session maximums are prefixed with the symbol `*`

Press button C to advance to detail review mode, here all data relating to the lap displayed will be available. Use button B to cycle round the recorded temperature and speed maximums for the current lap. Use button D to cycle round RPM, Difference from best lap time, difference from previous lap time and real time. Lap maximums are prefixed with the symbol `^`

- Each press of button C will advance to the next lap.
- Each press of button A will step back one lap.
- Press and hold button A or C to advance quickly over each lap.

Data Files & L-Sys Data Viewer

Offline review of data files from all sessions can be achieved by removing the micro SD flash card and connecting it to a suitable card reader and a suitable Windows PC.

There are two files that relate to any one session – the “.bjr” file stores all lap on lap peaks for each session. This is the best file for quick reference to lap times, maximum RPM, Speed, Temperatures etc. Located in the header of the file is a reference to the data log file “.log” relating to the same session.

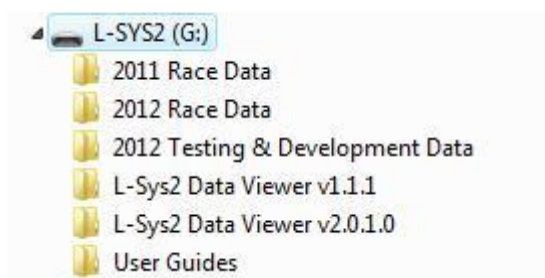
The “.log” file contains all logged data parameters, lap and sector time information etc which are recorded from the instant the unit is powered on, along with any beacon time events when the vehicle is on track and acquiring lap times. The data can be analysed in further detail with the BJR L-Sys Data Viewer software.

The file is a text based format so it can also be imported into MS Excel or similar for further analysis.

The L-Sys Data Viewer software is located on the micro SD card supplied with the L-Sys2 unit, or you can download the latest software and documentation from our website www.bjr-technology.co.uk

File Management – Important!

During start up the firmware checks the integrity of all the data files present on the micro SD card. As more files are stored on the media this process takes longer to complete. To maintain a quick unit start up it is recommended that you periodically i.e. when you have a hundred or so files to move all the .log and .bjr files that are of interest to a sub folder on the micro SD card. The following is just one example of a data structure you can put on the micro SD card to do this:



As with any computer based system it is vital to make routine backups of any data files on the micro SD card media and / or on your computer.

Further Information and Support

If you require any further advice regarding the installation or operation of your BJR Technology L-Sys2 then please contact us by e-mail to:

support@bjr-technology.co.uk

or visit our website www.bjr-technology.co.uk and use the contact form for further information

Firmware Updates

We reserve the right to continue the development of the L-Sys2 Race Console system. To that end we will release firmware updates to add functionality or to fix minor issues from time to time. Customers are entitled to one free firmware update on a return to base arrangement with return carriage paid. If you wish to take advantage of this free upgrade then please contact the support team.

Product Limitations of Use and Liability

Since the L-Sys2 and its associated components are solely intended for use in connection with motorsport (competitive or otherwise) or track day use, which are all deemed to be a hazardous pursuits, BJR Technology Ltd do not accept any liability whatsoever to any persons or property in connection with the installation or use of this equipment, or any of its associated components provided. Moreover, all equipment must be installed by a competent person and in a professional manner. It is imperative that the user of the equipment ensures that his or her race machinery and any associated equipment are in race worthy condition at all times. This clause does not affect any statutory guarantees.

Product Guarantee

Since the L-Sys2 and its associated components are solely intended for use in connection with motorsport (competitive or otherwise) or track day use, which are all deemed to be a hazardous pursuits, BJR Technology Ltd only offer a guarantee for a period as stated in our terms and conditions. The guarantee does not cover any damage due to misuse, bad or faulty installation or any accidental damage in any way. If the unit is found to have been tampered with in any way, then the guarantee given will be null and void.

Development Policy

Due to our continuous development policy BJR Technology Ltd reserve the right to update or change the specifications of the L-Sys2 or any of its associated components without any prior notice.

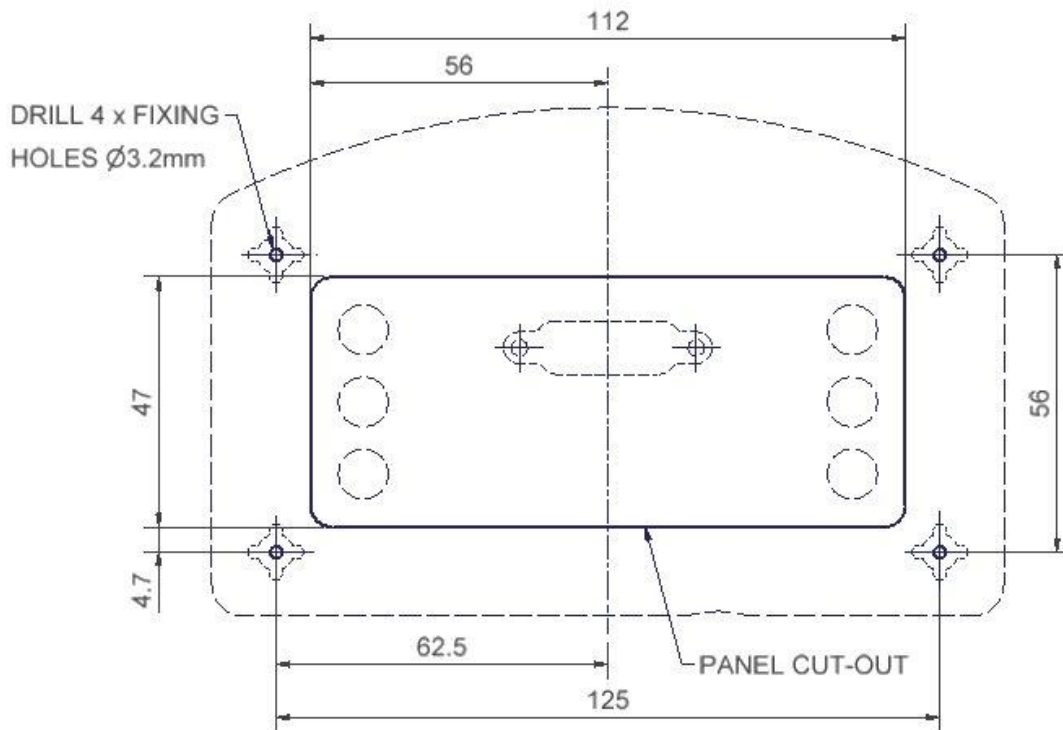
End of Life Product Disposal

Our products are been manufactured and distributed in accordance to the requirements of the WEEE Directive. The symbol below, the crossed out wheely bin symbol means that at the end of its useful life this product must be disposed of in a proper manner at a registered recycling facility. It must never be disposed of in a domestic waste bin as this action contravenes EC laws with substantial penalties. The only way to dispose of this product is by the method stated above.



Appendix A

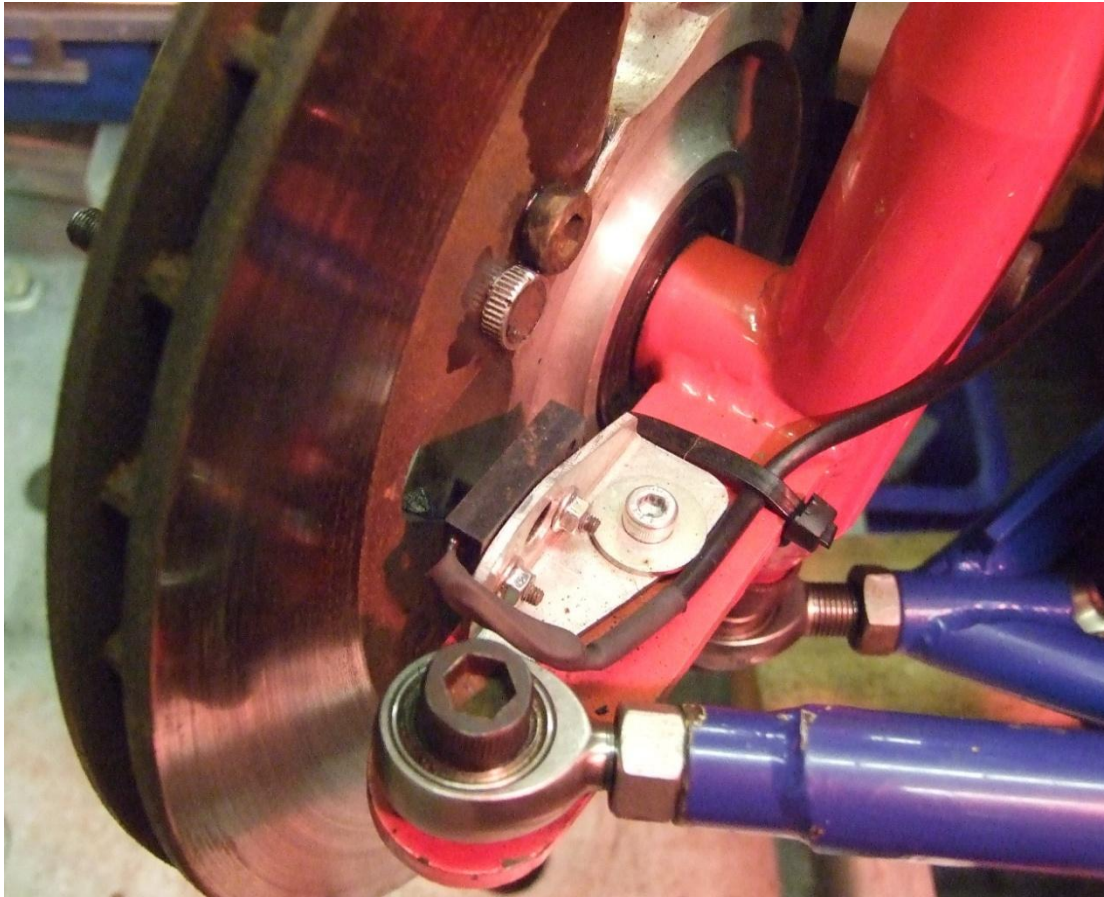
Mounting Details



Appendix B

Typical Wheel Sensor Installation

The following images show a typical installation of the wheel sensor.



The magnet must pass through an arc either side of the centre line of the pickup. In the picture above the magnet will sweep through an arc to the inside of the centre of the pickup

Appendix C - Complete this sheet for future reference when setting up any configuration parameters on the unit.

See next page

L-Sys2 Setup Sheet - Version 1.3

Customer: _____
 Vehicle: _____
 Date: _____

Configuration Menu Option:	Current Setting	(Default)
General		
Logging Enable (Y, N)	_____	(Y)
Auto Start (Off, 1 - 60 sec)	_____	(15 sec)
Pressure Display Units (PSI or BAR)	_____	(PSI)
Time		
Beacon Type (GPS, IR, Button, None)	_____	(GPS)
IR Beacon Obscuring Time (2 sec – 15 min)	_____	(1 min)
Real Time Clock Correctly Set (Time & Date)	_____	
Alarms		
LED A:		
Temperature T1, T2, Pressure, Disabled	_____	(T2 OO 50:130)
On: Over / Under / Outside	_____	
LED B:		
Temperature T1, T2, Pressure, Disabled	_____	(T1 OO 50:100)
On: Over / Under / Outside	_____	
LED C:		
Temperature T1, T2, Pressure, Disabled	_____	(PR OU 50)
On: Over / Under / Outside	_____	
LED D:		
Temperature T1, T2, Pressure, Disabled	_____	(PR OU 40)
On: Over / Under / Outside	_____	
Engine RPM		
Number of sparks per Engine Rev	_____	(1)
Shift Lights Mode	_____	(Auto)
Shift Light 6 Threshold (Gear Change Point)	_____	(11680)
Shift Light Step Decrement	_____	(-200)
RPM Pulse Obscuring Time (ObsT)	_____	(2500uS)
RPM Pulse Minimum Width (MinW)	_____	(500uS)
Speed		
No. of Pulses per Wheel Rev	_____	(GS)
Wheel Diameter (150 mm – 999 mm)	_____	(540)
Speed Units (KPH, MPH)	_____	(KPH)
Display Adjust (1 – 99%)	_____	(%)
Gear		
Primary Drive Ratio (1:0.000 – 1:5.000)	_____	(1:1.581)
Front Sprocket Teeth - for bike engines (1 – 99)	_____	(13)
Rear Sprocket Teeth - for bike engines (1 – 99)	_____	(46)
Total Number of Gears (1 – 9)	_____	(6)
Gear 1 Ratio (1:0.000 – 1:5.000)	_____	(1:2.600)
Gear 2 Ratio (1:0.000 – 1:5.000)	_____	(1:1.842)
Gear 3 Ratio (1:0.000 – 1:5.000)	_____	(1:1.500)
Gear 4 Ratio (1:0.000 – 1:5.000)	_____	(1:1.333)
Gear 5 Ratio (1:0.000 – 1:5.000)	_____	(1:1.200)

Gear 6 Ratio (1:0.000 – 1:5.000)	_____	(1:1.115)
Differential Ratio (1:0.000 – 1:5.000)	_____	(1:1.000)
Display Update Delay (0 to 5000mS)	_____	(500)
Gear Tolerance (0 - 9000)	_____	(1500)

Important: Whenever configuration settings are changed you must exit the configuration menu fully and confirm the saved changes when prompted - otherwise any changes made will not be saved.